

REMARKS

This is a full and timely response to the final Official Action mailed **December 12, 2008** (the "Office Action" or "Action"). Reconsideration of the application in light of the following remarks is respectfully requested.

Request for Continued Examination (RCE):

Applicant hereby requests Continued Examination for this application and entry and consideration of this amendment consequent thereto.

Claim Status:

Under the imposition of a previous Restriction Requirement, claims 1-31 and 40-59 were withdrawn from consideration. To expedite prosecution of this application, these claims have been cancelled without prejudice or disclaimer.

Further, in a previous office action claims 37-39 and 60-64 were also alleged to be drawn to nonelected species according to the previous Restriction Requirement, and were therefore withdrawn. Applicant will be entitled to rejoinder of any withdrawn dependent claims upon the allowance of any corresponding independent claims. MPEP § 821.04.

By the foregoing amendment, claims 32, 34, 61, and 62 have been amended. Claims 61 and 62 have been amended to depend from pending claim 32 and are consequently not longer withdrawn. Additionally, new claims 65-72 have been added. Thus, claims 32-36, 61, 62 and 65-72 are currently pending for further action.

Prior Art:Rejections under 35 U.S.C. §103(a):

In the recent final Office Action, claims 32-36 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,014,121 to Hasegawa et al. (hereinafter “Hasegawa”) in view of U.S. Patent Application Publication No. 2001/0002695 to Takata et al. (hereinafter “Takata”).

Claim 32:

Independent claim 32 recites:

A high speed 3D surface imaging camera comprising:
a light projector for selectively illuminating an object, said light projector being configured to project *three sequential light beam projections having different colors and different spatially varying intensity patterns* from said projector onto said object; and
an image sensor configured to receive reflected light from said object and to *generate three separate color image data sets based on said three sequential, differently colored, variable intensity pattern light beam projections*, said three separate color image data sets providing said 3D image data of said object.
(Emphasis added).

Support for the amendment to claim 32 can be found in Applicant’s originally filed specification at, for example, paragraphs [0029] and [0030].

In contrast, Hasegawa and Takata do not teach or suggest a high-speed 3D surface imaging camera comprising a light projector for selectively illuminating an object, the light projector being configured to project three sequential light beam projections having different colors and different spatially varying intensity patterns, and an image sensor configured to

receive reflected light from the object and to generate three separate color image data sets based on the three sequential, differently colored, variable intensity pattern light beam projections.

The final Office Action concedes that “Hasegawa does not teach said three separate color image data sets (RGB) providing said 3D image data of said object.” (Action, p. 5). In order to make up the deficiency of Hasegawa, the final Office Action cites to Takata, and states that Takata teaches that “a phase value calculation means (9) calculates a plurality of phase values from the RGB image signals,” and that the phase value calculation means (9) calculates XYZ coordinates and the 3D shape of the object (O) is uniformly measured (Para 61-65).” (Action, p. 5). Thus, Takata teaches that the 3D shape of an object is measured based on the *phase* of the red, green, and blue image signals. (Takata, paras. [0061]-[0065]). Takata does not teach or suggest calculating a distance from a point on an object to an image capture device that is determined as a function of intensity or wavelength of projected light.

However, claim 32 recites project three sequential light beam projections having different colors and different spatially varying intensity patterns, and generating three separate color image data sets based on the three sequential, differently colored, variable intensity pattern light beam projections. Hasegawa and Takata clearly do not teach or suggest this subject matter.

Further, Applicant argues that the modifications of Hasegawa proposed in the Final Office Action would render Hasegawa unsatisfactory for its intended purpose. Hasegawa teaches that “image signals corresponding to the respective colors... are integrated together...to thereby be displayed in color on a screen of a color TV monitor 23.” (Id, col. 4, line 67 to col. 5, line 9). In other words, Hasegawa exclusively teaches a method of producing a 2D image. In contrast to the teachings of Hasegawa, the Advisory Action of April 24, 2009 states that the “Takata

reference was used to show a 3-CCD sensor can create XYZ coordinate image data or 3D image data.”

Applicant wishes to point out that “[i]f [the] proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). MPEP § 2143.01. Thus, because the modification of Hasegawa via Takata would render the invention of Hasegawa unsatisfactory for its intended purpose of functioning as a means to produce a 2D image, there is no suggestion or motivation to make the proposed modification.

The Supreme Court recently addressed the issue of obviousness in *KSR Int’l Co. v. Teleflex Inc.*, 127 S.Ct. 1727 (2007). The Court stated that the *Graham v. John Deere Co. of Kansas City*, 383, U.S. 1 (1966), factors still control an obviousness inquiry. Under the analysis required by *Graham v. John Deere*, 383 U.S. 1 (1966) to support a rejection under § 103, the scope and content of the prior art must first be determined, followed by an assessment of the differences between the prior art and the claim at issue in view of the ordinary skill in the art. In the present case, the scope and content of the prior art, as evidenced by Hasegawa and Takata, did not include the claimed subject matter, particularly a high-speed 3D surface imaging camera comprising a light projector for selectively illuminating an object, the light projector being configured to project three sequential light beam projections having different colors and different spatially varying intensity patterns, and an image sensor configured to receive reflected light from the object and to generate three separate color image data sets based on the three sequential, differently colored, variable intensity pattern light beam projections.

The differences between the cited prior art and the claimed subject matter are significant because the recitations of claim 32 provide for a system that eliminates crosstalk between multiple lighting patterns within the same field cycle, while maintaining a simplified and less expensive multi-spectrum projection mechanism with high image collection rates. Thus, the claimed subject matter provides features and advantages not known or available in the cited prior art. Consequently, the cited prior art will not support a rejection of claim 32 under 35 U.S.C. § 103 and *Graham*.

Additionally, various dependent claims of the application recite subject matter that is further patentable over the cited prior art. Specific, non-exclusive examples follow.

Claim 35:

Claim 35 recites: “[t]he high speed 3D surface imaging camera of claim 32, further comprising a computing device communicatively coupled to said image sensor wherein said computing device is *configured to combine said separate color image data sets into a composite Rainbow-type image of said object*. (Emphasis added). In contrast, Hasegawa and Takata do not teach or suggest a high-speed 3D surface imaging camera comprising a computing device configured to combine said separate color image data sets into a composite Rainbow-type image of said object.

As discussed above in connection with independent claim 32, Hasegawa and Takata do not teach or suggest calculating a distance from a point on an object to an image capture device via the wavelength of projected light. Clearly, since Hasegawa does not teach forming a 2D

image, a calculation of distance from an object is irrelevant. Further, Takata teaches that the 3D shape of an object is measured based on the *phase* of the red, green, and blue image signals and, does not teach or suggest calculating a distance from a point on an object to an image capture device via a wavelength of projected light. (Takata, paras. [0061]-[0065]).

However, claim 35 recites a computing device configured to combine said separate color image data sets into a composite *Rainbow-type image* of said object. (Emphasis added). This subject matter is clearly outside the teachings of Hasegawa and Takata.

Again, under the analysis required by *Graham v. John Deere*, 383 U.S. 1 (1966) to support a rejection under § 103, the scope and content of the prior art must first be determined, followed by an assessment of the differences between the prior art and the claim at issue in view of the ordinary skill in the art. In the present case, the scope and content of the prior art, as evidenced by Hasegawa and Takata, did not include the claimed subject matter, particularly a high-speed 3D surface imaging camera comprising a computing device configured to combine said separate color image data sets into a composite Rainbow-type image of said object.

The differences between the cited prior art and the claimed subject matter are significant because the recitations of claim 32 provide for a system that forms a 3D image of an object while maintaining a simplified and less expensive multi-spectrum projection mechanism with high image collection rates. Thus, the claimed subject matter provides features and advantages not known or available in the cited prior art. Consequently, the cited prior art will not support a rejection of claim 35 under 35 U.S.C. § 103 and *Graham*.

New Claims:

The newly added claims are thought to be patentable over the prior art of record for at least the same reasons given above with respect to the original independent claims. Therefore, examination and allowance of the newly added claims is respectfully requested.

Conclusion:

In view of the foregoing arguments, all claims are believed to be in condition for allowance over the prior art of record. Therefore, this response is believed to be a complete response to the Office Action. However, Applicant reserves the right to set forth further arguments in future papers supporting the patentability of any of the claims, including the separate patentability of the dependent claims not explicitly addressed herein. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed.

The absence of a reply to a specific rejection, issue or comment in the Office Action does not signify agreement with or concession of that rejection, issue or comment. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment. Further, for any instances in which the Examiner took Official Notice in the Office Action, Applicants expressly do not acquiesce to the taking of Official Notice, and respectfully request that the Examiner provide an affidavit to support the Official Notice taken in the next Office Action, as required by 37 CFR 1.104(d)(2) and MPEP § 2144.03.

If the Examiner has any comments or suggestions which could place this application in better form, the Examiner is requested to telephone the undersigned attorney at the number listed below.

If any fees are owed in connection with this paper that have not been elsewhere authorized, authorization is hereby given to charge those fees to Deposit Account 18-0013 in the name of Rader, Fishman & Grauer PLLC.

Respectfully submitted,

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